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1945 OIL REVIEW

an analysis of
ALBERTA'S
Oil Industry

By J. L. IRWIN



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ALBERTA OIL REVIEW FOR 1945

By

J. L. IRWIN*

No discussion of Alberta's oil industry in 1945 can be entered upon without first making reference to the irreparable loss sustained by the province, by Canada and the world outside as a result of the sudden death of Dr. E. H. Boomer.

He died at his home in Edmonton on Saturday, October 27th, at the age of 45. For twenty years he had been associated with the Department of Chemistry of the University of Alberta as a professor of chemistry and professor of chemical engineering. In addition to this he had held the following appointments:—Chairman of the Petroleum and Natural Gas Conservation Board, Commissioner of the Alberta Natural Gas Utilities Board, Consultant to the Allied War Supplies Corporation, to the Department of Munitions and Supply of the federal government in its reconstruction programme, to the National Research Council at Ottawa, was University liaison officer to the War Assets Corporation, and was a member of the executive of the Alberta Research Council.

He was regarded as one of the world's leading authorities on the utilization of oil sands and natural gas. It was only at his death that the general public for the first time became aware of the fact that he had been a most important factor in the preliminary research work on the atomic bomb, and of all that he had contributed scientifically to the war effort. His duties were manifold, and his amazing power of application to them was seemingly inexhaustible.

He had been closely associated with the construction and putting into operation of Alberta Nitrogen Products, Limited, in Calgary, and assisted in its direction as representative of the Allied War Supplies Corporation. The Trail, B.C., ammonia plant received outstanding help from his efforts, and much of his time had been devoted to the perfection of high octane gasoline produced in two Calgary plants.

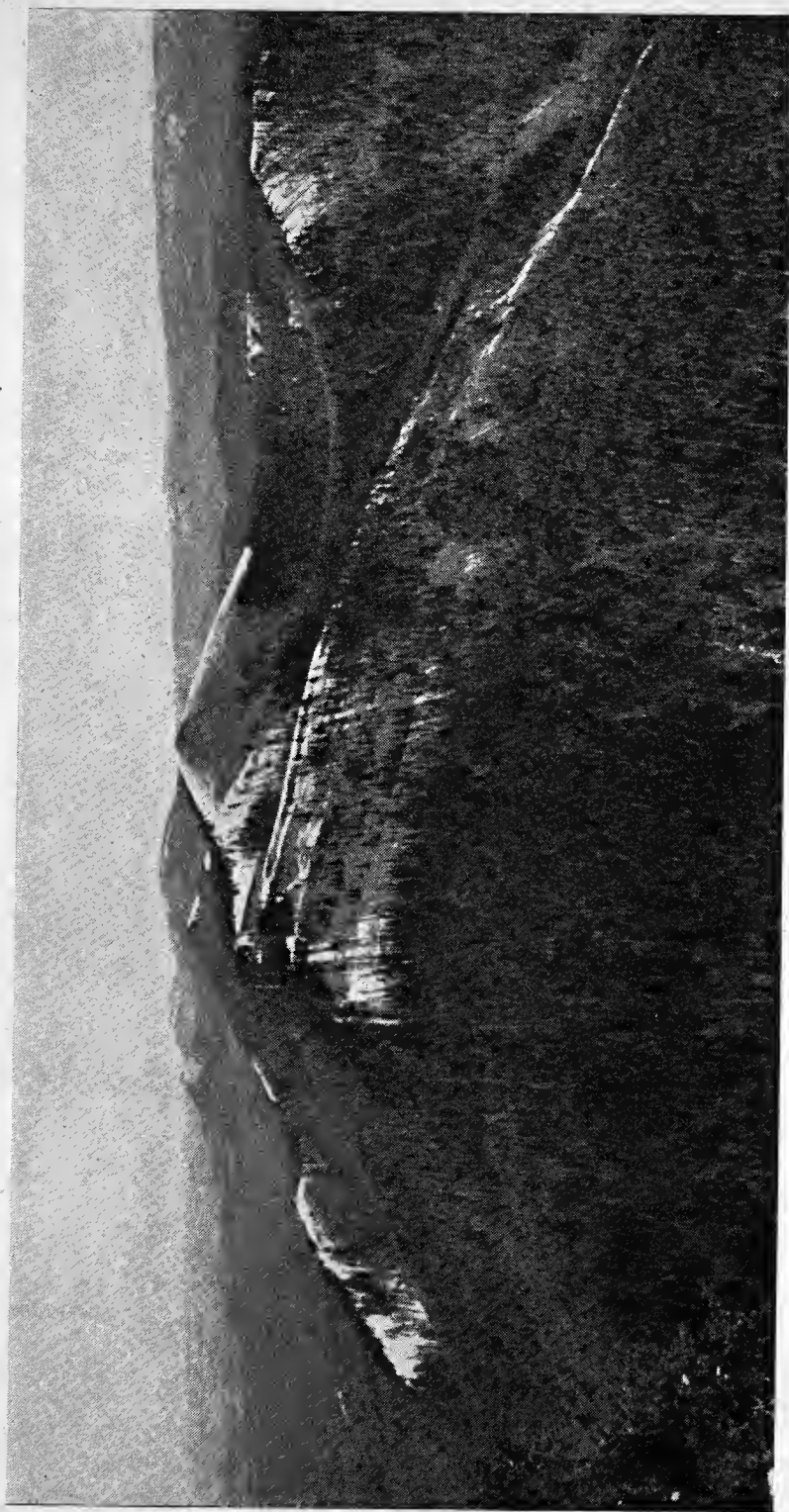
Space will not permit a full description of his innumerable activities in the world of science. At the close of the war, a party of fifty British and American experts were named to inspect Germany's oil industry and synthetic oil plants. Dr. Boomer was one of the two Canadians chosen.

Amongst honours conferred on him at different times were degrees from the Canadian universities of British Columbia and McGill.



The late Dr. E. H. Boomer

(*) Supervisor of Publications, Publicity Bureau.



Ram River—Clearwater anticline in the foothills, west of Red Deer, showing Madison limestone exposure—looking south

He was a Ramsey Memorial Fellow, working under Lord Rutherford in the Cavendish Laboratory at Cambridge, England; a Fellow of the Royal Society of Canada; a Fellow of the Chemical Institute of Canada; and also was a member of the Association of Professional Engineers of Alberta.

Many offers of a most lucrative nature were made to him from time to time by large chemical and industrial organizations, but he refused them all, preferring to remain with his research work in the University of Alberta. This included the processing of benzene from Turner Valley's natural gas, the hydrogenation of bitumen from McMurray's bituminous sands, and the hydrogenation of Alberta's coal. With reference to this last item, his experiments yielded oil as high as seventy per cent of the weight of those coals bordering between the bituminous and domestic types. The last work with which he was engaged was in relationship to the Fischer-Tropsch process for converting natural gas into liquid fuels.

At a memorial service held in Edmonton on Monday, October 29th, prior to the funeral taking place in Vancouver, Dr. Boomer's birthplace, D. E. Cameron, for many years librarian of the University of Alberta, paid a special tribute.

Mr. Cameron spoke of the tremendous contributions to Canada and to the outside world which Dr. Boomer had made as a great scientist, whose dynamic powers had continually enriched the vitally important sphere of chemical engineering. His contribution to humanity, he added, also had been great.

A quiet manner, modesty, simplicity and an ability to create and hold a friendship were characteristics which had endeared him to so many. Like all big men, he was ever ready to encourage and assist the little man, to lend a helping hand to the many who appealed to him for help, and at all times to offer unsparingly his brilliant services for the general benefit of his country.

In the swiftly changing world of today, men of substance in public life come and go. Once gone, others take their places, and outstanding work performed in the interests of national welfare is often soon forgotten.

The memory of Dr. Boomer's work, however, will not quickly fade. It will be retained in the hearts and minds of those whose special privilege it had been to have known him. After they too have gone, official records will continue to preserve the story of his service to man.

ALBERTA'S OIL INDUSTRY IN 1945

Alberta's oil industry was unable to halt the production decline in 1945. Production for the year totalled 8,055,440 barrels, a decrease of 733,286 in comparison with 1944.

The decrease in 1944 was 885,822 barrels. The 1945 decline therefore is 152,536 less than in the previous year. As fields outside of Turner Valley in 1945 show a production increase of 170,967 barrels, credit for reduction in the total provincial decline goes of course to their performance during the year. Turner Valley's decline last year was 904,253 barrels.

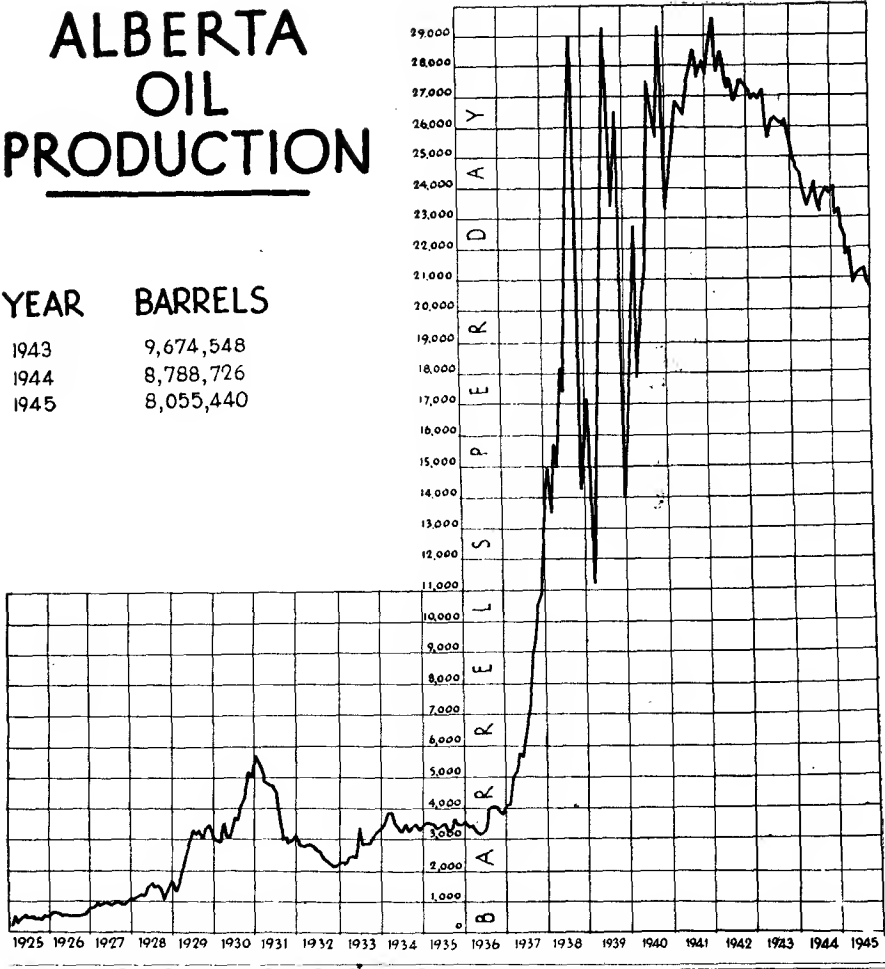
Detailed statistical tables covering the last two years follow.



Ram River anticline, looking north, showing Madison limestone and Banff shales. Limestone vertical fault, referred to locally as "China Wall", is seen on the east flank. This fault runs north and south, practically full length of structure, and averages approximately a mile in width and about twenty-seven in length

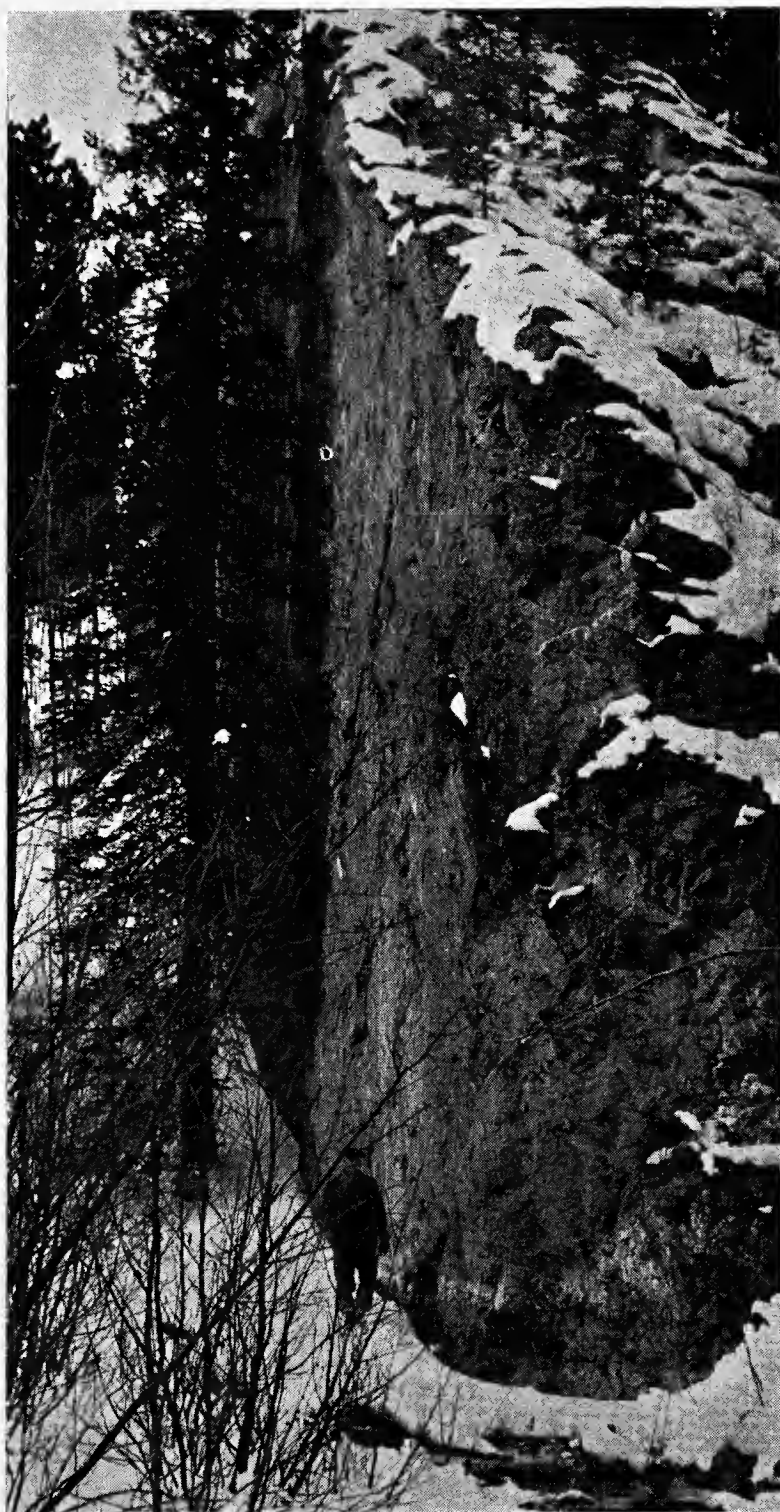
ALBERTA OIL PRODUCTION

YEAR	BARRELS
1943	9,674,548
1944	8,788,726
1945	8,055,440



ALBERTA OIL PRODUCTION (Quantities in barrels)

MONTH			CHANGES	DAILY AVERAGE	
	1944	1945		1944	1945
January	764,913	744,167	—20,746	24,674	24,005
February	707,882	650,432	—57,450	24,409	23,230
March	758,004	725,231	—32,773	24,451	23,394
April	717,452	678,546	—38,906	23,915	22,618
May	738,817	695,477	—43,340	23,833	22,434
June	700,045	651,483	—48,562	23,335	21,716
July	730,184	680,506	—49,678	23,554	21,952
August	750,144	669,755	—80,389	24,192	21,605
September	718,401	624,615	—93,786	23,946	20,821
October	736,073	652,159	—83,914	23,744	21,037
November	720,399	640,516	—79,883	24,012	21,350
December	746,412	642,553	—103,859	24,079	20,728
TOTALS	8,788,726	8,055,440	—733,286	24,020	22,069



A closer view of vertical fault or "China Wall" in the foothills area

VALUATION TO PRODUCERS

1944	1945	CHANGES
\$14,468,061	\$13,106,928	—\$1,361,133

OIL PRODUCTION FROM TURNER VALLEY 1944 and 1945

(Quantities in barrels)

1944	LIMESTONE ZONE	SHALLOW ZONE	NATURAL GASOLINE	TOTAL
January -----	693,177	370	43,630	737,177
February -----	641,559	250	41,775	683,584
March -----	682,077	270	48,390	730,737
April -----	637,218	250	37,284	674,752
May -----	662,048	270	34,922	697,240
June -----	629,938	370	27,542	657,850
July -----	661,734	371	25,124	687,229
August -----	678,563	226	25,890	704,679
September -----	652,474	208	29,350	682,032
October -----	659,553	208	34,255	694,016
November -----	631,566	208	47,089	678,863
December -----	645,012	208	52,935	698,155
TOTALS -----	7,874,919	3,209	448,186	8,326,314

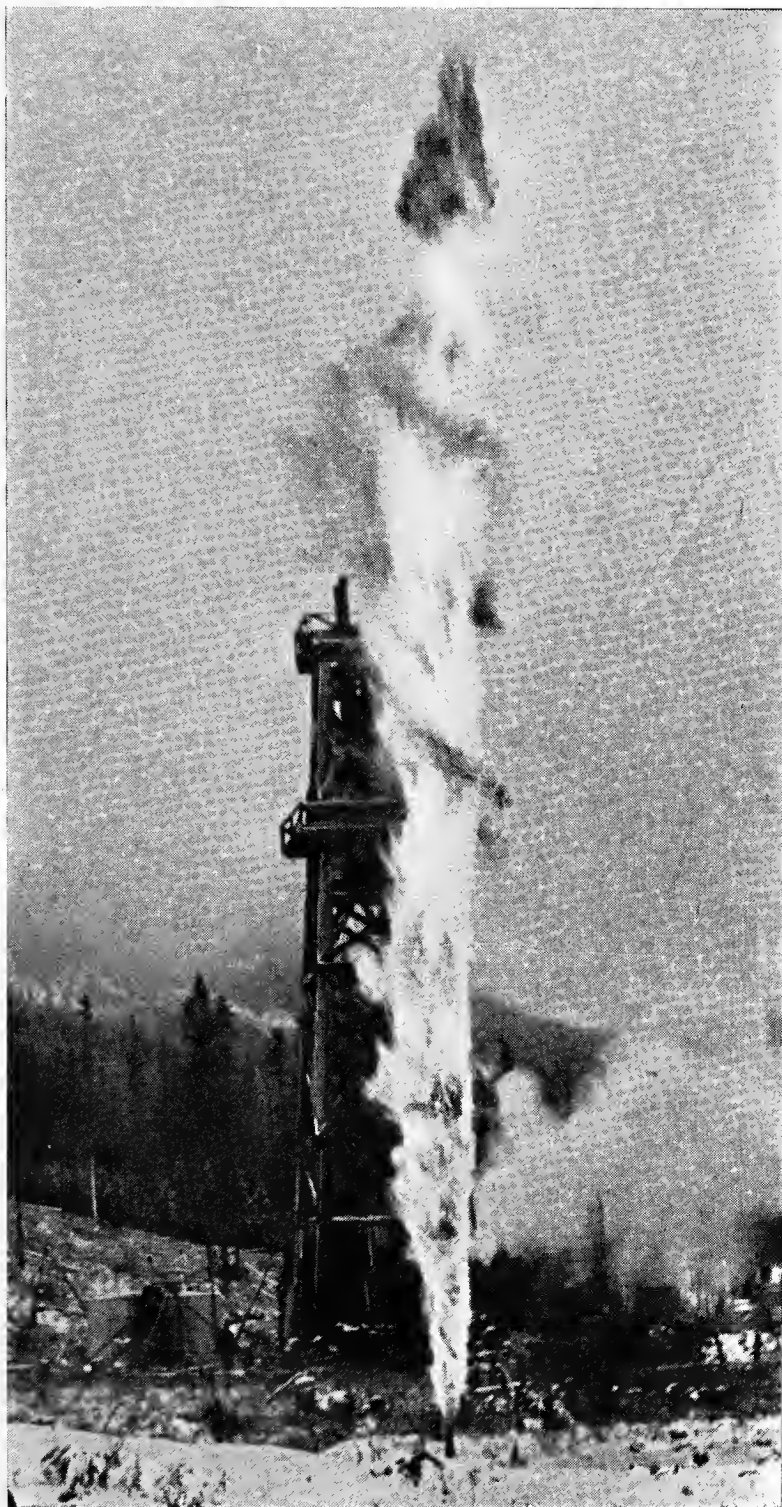
1945	LIMESTONE ZONE	SHALLOW ZONE	NATURAL GASOLINE	TOTAL
January -----	643,028	216	47,717	690,961
February -----	568,662	150	38,167	606,979
March -----	645,363	162	34,903	680,428
April -----	594,410	150	33,739	628,299
May -----	622,989	250	28,728	651,967
June -----	574,460	218	26,628	601,306
July -----	593,255	234	27,424	620,913
August -----	576,181	755	28,719	605,655
September -----	535,163	586	32,665	568,414
October -----	552,496	515	36,125	589,136
November -----	551,639	462	38,711	590,812
December -----	547,943	234	39,014	587,191
TOTALS -----	7,005,589	3,932	412,540	7,422,061

CHANGES

—869,330	+723	—35,646	—904,253
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OIL PRODUCTION FROM FIELDS OUTSIDE TURNER VALLEY (Quantities in barrels)

FIELD	1944	1945	CHANGE
Vermillion -----	234,603	238,358	+ 3,755
Conrad -----	24,733	143,696	+118,963
Taber -----	148,638	135,000	— 13,638
Wainwright -----	17,154	16,472	— 682
Red Coulee -----	3,835	-----	— 3,835
Princess -----	13,815	63,377	+ 49,562
Tilley -----	3,137	593	— 2,544
Del Bonita -----	9,366	4,091	— 5,275
Lloydminster -----	6,296	28,321	+ 22,025
Moose Dome -----	628	-----	— 628
Ram River -----	207	-----	— 207
Jumping Pound -----	-----	3,471	+ 3,471
TOTALS -----	462,412	633,379	+170,967



Ram River Oils, Limited, No. 2 test well, showing crude oil flare

ALBERTA'S ANNUAL OIL PRODUCTION TOTALS

1914 to 1945, inclusive.

(Quantities in barrels of 35 imperial gallons)

1914-21-----	56,675	BROUGHT FORWARD	7,144,086
1922-----	15,796	1934-----	1,266,049
1923-----	10,003	1935-----	1,263,968
1924-----	17,749	1936-----	1,320,428
1925-----	180,885	1937-----	2,796,874
1926-----	219,598	1938-----	6,743,101
1927-----	332,312	1939-----	7,593,492
1928-----	489,532	1940-----	8,495,207
1929-----	999,523	1941-----	9,908,643
1930-----	1,436,259	1942-----	10,136,296
1931-----	1,454,816	1943-----	9,674,548
1932-----	918,154	1944-----	8,788,726
1933-----	1,012,784	1945-----	8,055,440
CARRIED FORWARD	<u>7,144,086</u>	TOTAL-----	<u>83,186,858</u>

NOTE:—The above is a revised production table, in comparison with those published in the years prior to 1943. Revisions in yearly totals, made necessary by the receipt of additional data, include for 1942 a deduction of 6,974 barrels for storage loss at Vermilion.

FOOTAGE DRILLED IN 1945

Turner Valley-----	159,049
Fields outside Turner Valley-----	384,388
TOTAL-----	<u>543,437</u>

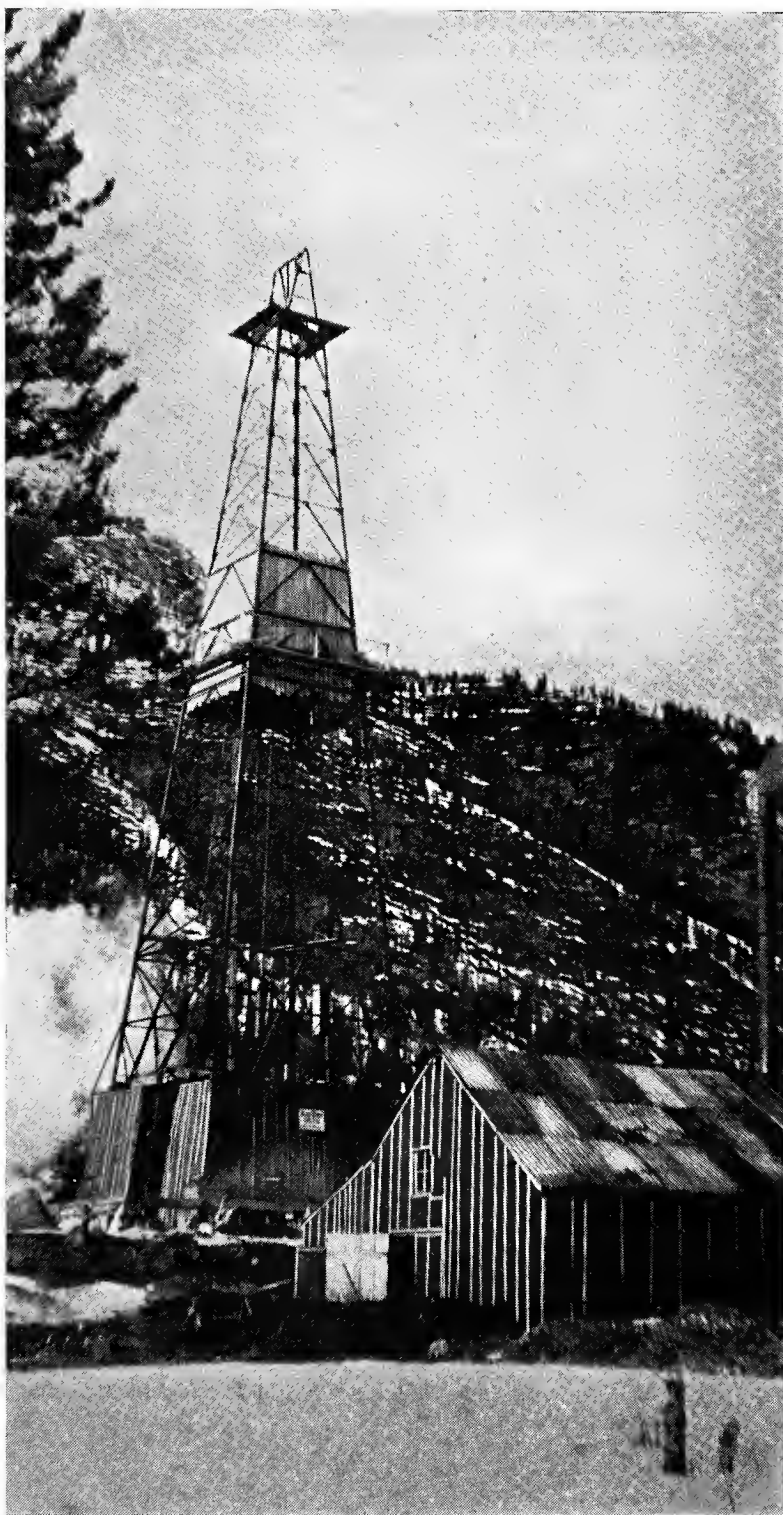
NATURAL GAS CONSUMPTION

1944 and 1945

(Quantities in mcf.)

	1944.	1945.
Turner Valley-----	41,377,908	37,660,452
Less waste-----	14,730,645	8,260,040
NET-----	<u>26,647,263</u>	<u>29,400,412</u>
Fields outside Turner Valley-----	11,886,373	14,631,336
Less waste-----	74,310	285,410
NET-----	<u>11,812,063</u>	<u>14,345,296</u>
ALBERTA TOTALS-----	<u>38,459,326</u>	<u>43,746,338</u>

In oil producing countries of the world, outside of Canada, development in 1945 was intensive, and production totals reached the highest peak in petroleum's history. This, regrettably, failed to be the case in Canada, particularly in Alberta, from which province about ninety per cent of Canada's oil is derived.



Ram River Oils, Limited, No. 4 well drilling on Clearwater anticline

NUMBER OF ALBERTA PRODUCING OIL AND NATURAL GAS WELLS

(As at December 31st, 1945)

OIL:

Turner Valley: Shallow zone -----	2
Limestone zone -----	282
	<hr/> 284
Taber -----	11
Vermilion -----	47
Wainwright -----	7
Conrad -----	17
Other fields -----	19
	<hr/> 385

NATURAL GAS:

Turner Valley: Shallow zone -----	1
Limestone zone -----	322
	<hr/> 323
Foremost -----	3
Viking and Kinsella -----	32
Medicine Hat -----	42
Redcliff -----	13
Other fields -----	30
	<hr/> 443

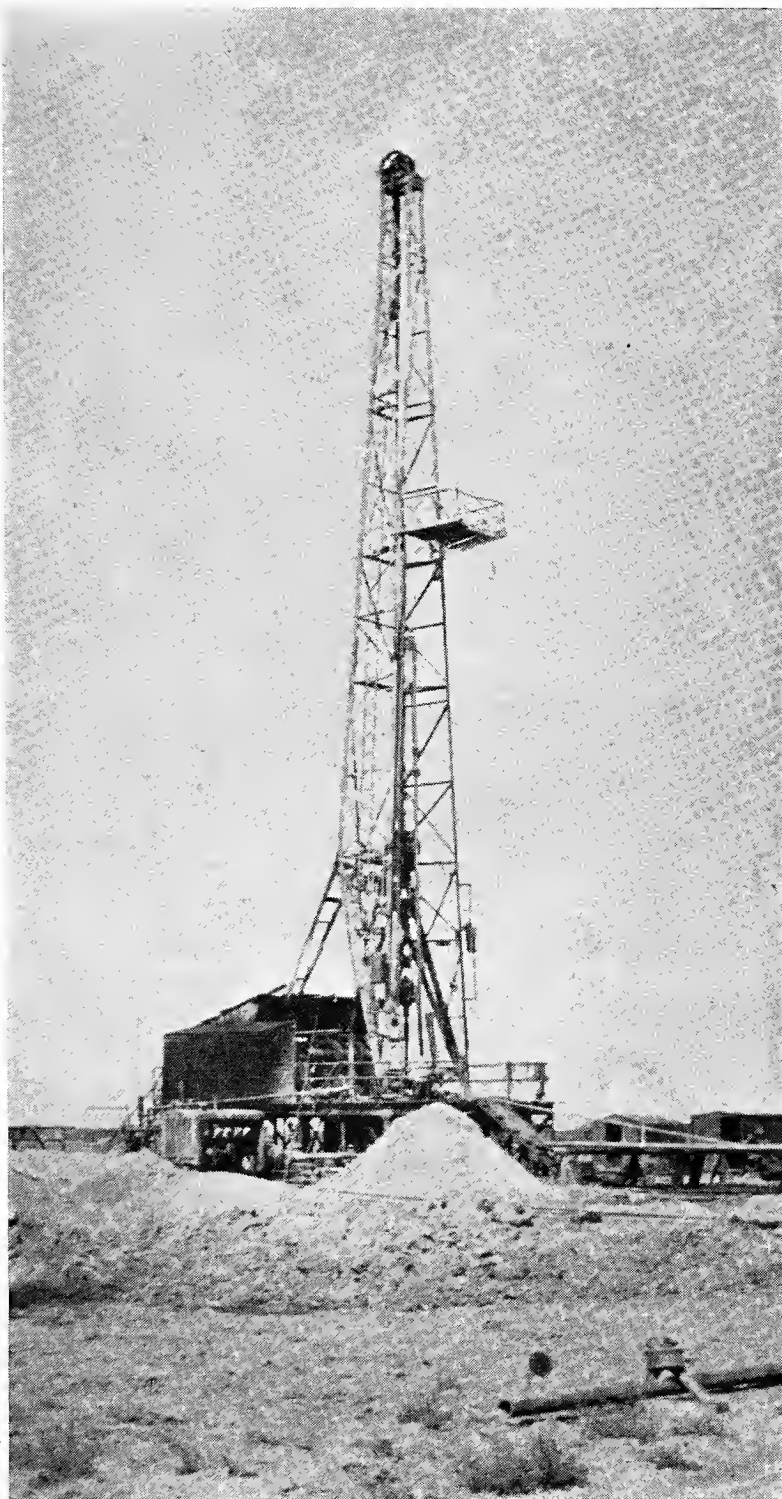
TOTAL PRODUCING OIL AND NATURAL GAS WELLS IN ALBERTA----- 828

TURNER VALLEY AND OTHER FIELDS

By the end of the first half-year in 1945, Alberta's decline was being noticeably reduced, due to the encouraging performance of newly completed wells just west of Turner Valley townsite in the centre of the field, and to that of the big wells in the north end. The latter part of the year, however, gave a different picture. Declines in these two areas set in and were accompanied by others throughout the length of the famous Turner Valley field, which resulted at the end of the year in the Valley's annual production total being decreased by 904,253 barrels.

In the last yearly report, and in others previous to that, brief reviews covering Turner Valley's history have been presented. Without attempting to do this again, it might, however, be stated that Turner Valley's record as a major oil field will compare favourably with any of the great oil fields of the outside world. It is a record that Alberta has reason to be proud of, and one which possesses three outstanding points to be noted. Firstly, the Valley is the oldest oil field in Alberta, has produced oil for 31 years and is still producing on a major scale in spite of heavy annual declines; secondly, out of an approximate total of 83,000,000 barrels which the province has produced over this period, Turner Valley has contributed around 81,000,000—or about 97.65 per cent; thirdly, as a result of the Valley's performance, Canada, since 1939, has taken second place in the British Empire for oil production, and in doing so has taken her place amongst the oil producing countries of the world.

The situation in 1945 was brighter in other producing fields of the province, in which the sum total of production was increased by 170,967 barrels. Conrad, Princess, Lloydminster and Vermilion were the principal contributors to this, each providing an increase which helped to alleviate the general Alberta situation.



*Conrad field—The California Standard Company well, Conrad-Province,
No. 77-33 B*

Of these four fields Conrad's advance was the most noticeable, with an increase of 118,963 barrels. Next came Princess with an increase of 49,562, followed by Lloydminster with 22,025 and Vermilion with 3,755.

On examination of the December official monthly report, the Conrad field presented an average of 517 barrels daily from 17 wells; Princess 207 from 8 wells; Lloydminster 115 from 9 wells and Vermilion 569 from 47 wells. The figures covering Lloydminster deal of course only with the wells on the Alberta side of the boundary, but the field extends into the Province of Saskatchewan where production is now also being obtained.

The performance of these four made a good showing and produced results which were sufficiently helpful in offsetting Turner Valley's major decline to bring the Province's decrease down to 733,286 barrels.

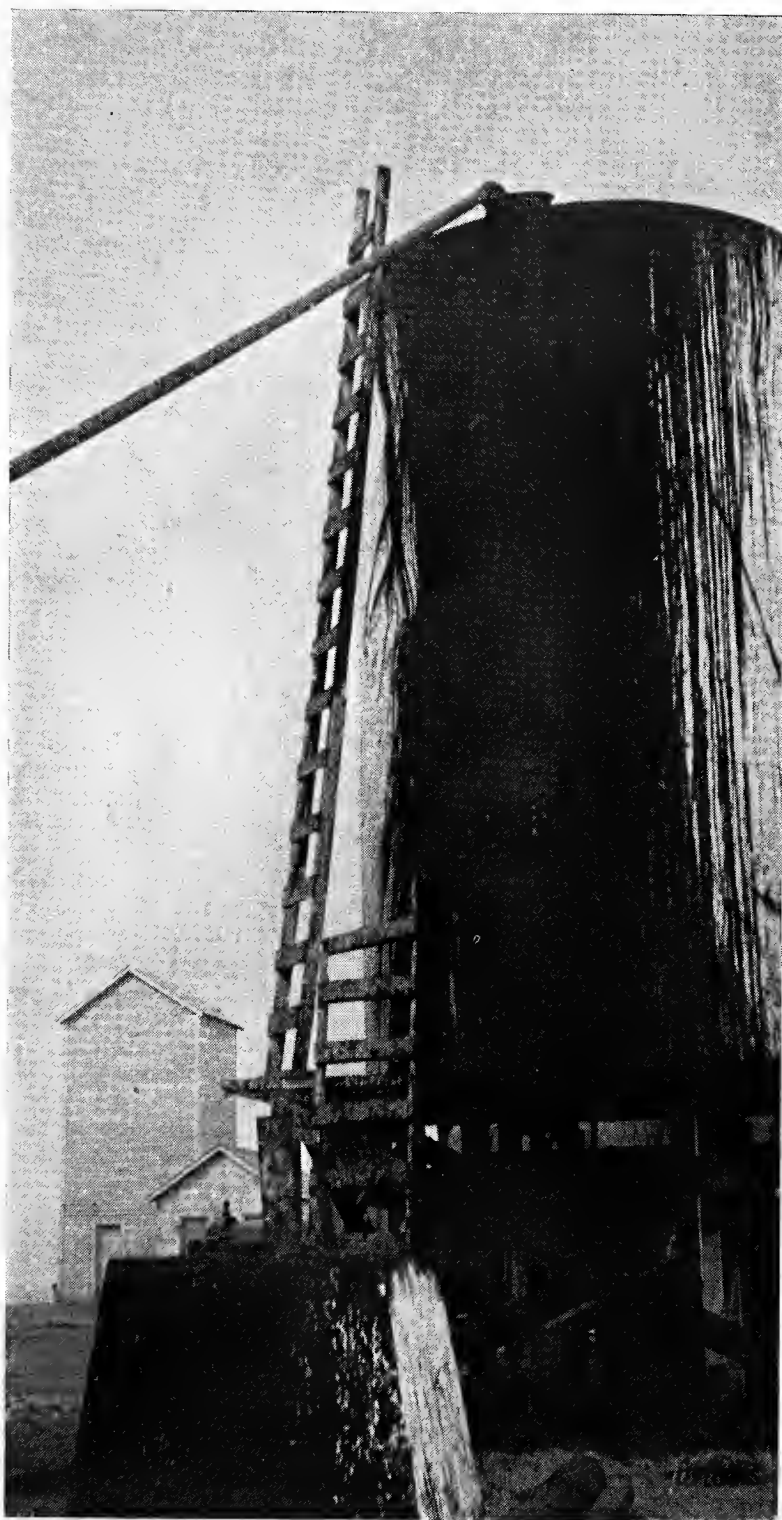
A second major field, however, is very much needed. So far, in spite of the excellent results they have produced, not one of these four outside fields has as yet come under this classification. A second Turner Valley is the objective being sought—two or three more of this category as a matter of fact. With all the favourable geological survey work completed in recent years, added to the intensive exploration of last year which will doubtless be carried on into the present one, this may come.

Development is continuing in the Jumping Pound area where the Shell No. 16-14-J well was reported on February 25th, 1946, to be drilling at a depth of 3,532'. The Home-Brazeau Syndicate well, some 25 miles to the north-west of the railway terminus at Brazeau, was on the same date reported drilling at 11,594'. This is another of the important test wells in the foothills which is being watched with much interest.

Ram River Oils, in the same area to the south-east, are drilling their Nos. 3 and 4 wells. No. 3 on February 25th was down to 5,745', whilst No. 4, just after spudding in, was reported on the same date to be at 382' and preparing to run 10" casing.

Ram River Oils, with a background covering years of pioneer development work in the important foothills area, have in their No. 3 and No. 4 test wells two most interesting operations in that district. No. 1 well, striking a major fault, was abandoned. No. 2, with a small recovery of valuable oil, the analysis of which has already been published, was too low in the structure and possessed too small a hole. No. 3 drill site is close to that of No. 2, whilst No. 4 on the Clearwater River is some 12 miles to the south-east of No. 3 and close to the site of the Altoba well, which was drilled some years ago.

Consideration should be given to all that development work, in a country as rugged as the foothills, must entail. Roads must be cut through the bush, and low-lying ground calls for the building of many culverts and bridges before the extremely heavy equipment can reach the drilling sites. Adverse weather may cause long and disheartening delays and mishaps. These are only a few of the problems which oil pioneering in such a country must involve, as compared with similar development in the plains. Much improvement work has now been done, and modern camps and equipment are on the sites. In consideration of these facts, the drilling of these two most interesting test wells no doubt will be followed with the closest of attention.



Vermilion — overflow of oil in filling storage tank

EXPLORATORY WORK

As already stated, exploratory work was intensified throughout the province in 1945, which will no doubt be continued in the current year. Many reservations of considerable size have been taken over in this respect. Amongst them is one of major dimensions, involving 207,360 acres in the Smoky River area, approximately midway between Entrance on the C. N. R. main line and Grande Prairie. This was taken over just recently by the combined forces of the McColl-Frontenac, Shell, Gulf, Imperial and Socony Vacuum companies. Other instances could be mentioned to illustrate the fact that exploration work, which may lead to major development, is continuous in Alberta's oil world.

NATURAL GAS

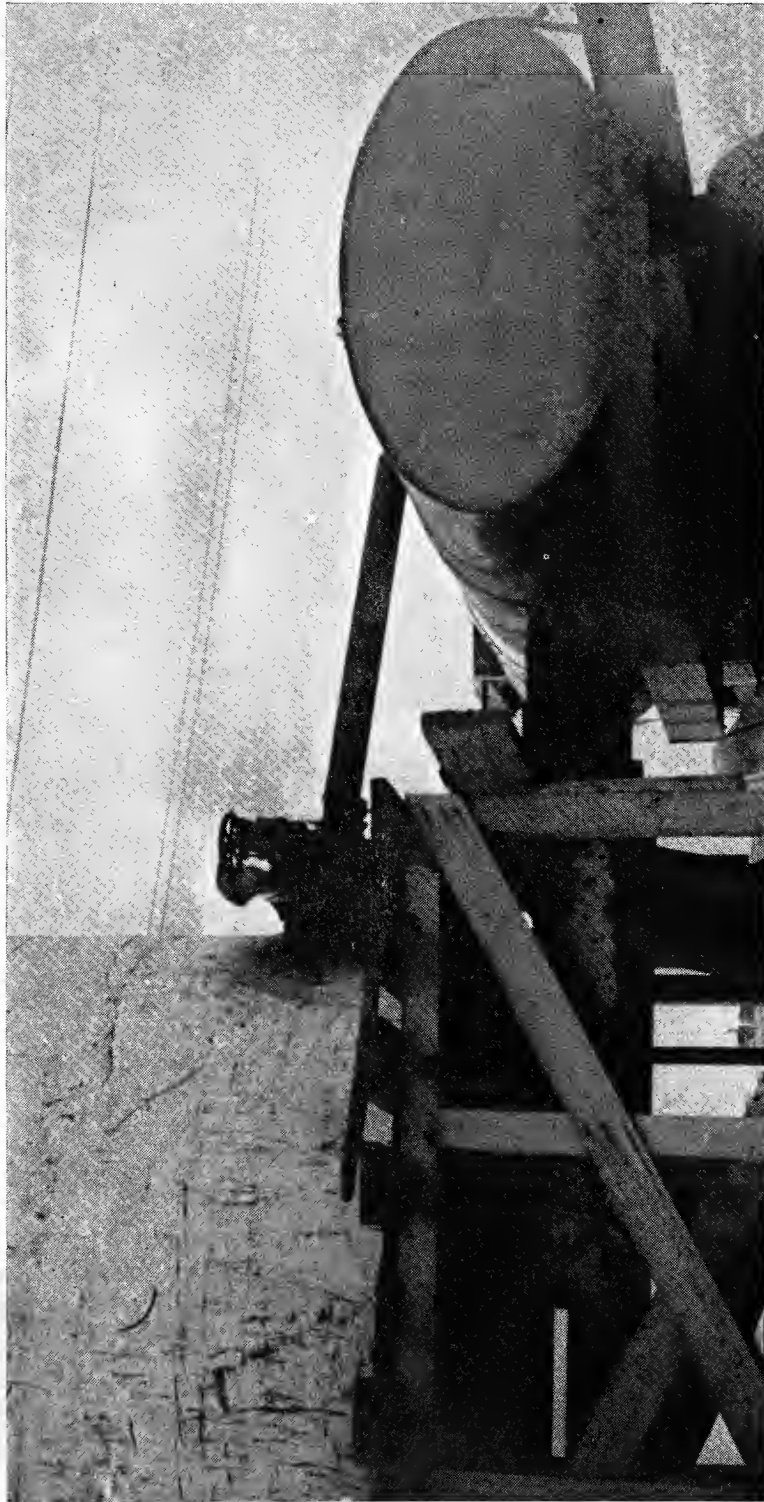
An item of interest at the end of the year was the entry of the Imperial Oil Company into the Kinsella natural gas field with a drilling programme which is under way with successful completions already having been effected. The first two wells to be brought in were from six to eight miles to the east of producing wells in the established field. With this extension of area, the Viking-Kinsella field must now be regarded as one of the largest and most important natural gas reserves in Alberta. This, in addition to the highly productive natural gas reserves of Medicine Hat, Princess, the international boundary and other fields throughout the province, establishes Alberta as the leading province in Canada for the production of natural gas, to be added to her premier position in production of oil and coal. Added to this again is her possession of the largest accumulation of bituminous sands in the world, which is now under development at Bitumount on the Athabaska River.

BITUMINOUS SANDS OF ALBERTA

Three most interesting and instructive brochures have just been released by the Research Council of Alberta. Two under the headings of "Bituminous Sands in Alberta" and "Asphaltic Road Oils from Alberta Bituminous Sand" are by Dr. K. A. Clark, research engineer of the Research Council. The third, by E. O. Lilge, research engineer of the Research Council, is entitled "Purification of Silica Sand."

The two by Dr. Clark deal with the vast bituminous sands reserve of Northern Alberta, historically and generally, in a most informative manner and offer a map showing the reserve's locality, together with pictures. A paragraph from this material is quoted as follows:

"The Government of Alberta has authorized the building of an experimental separation plant and necessary refinery at a site which it has taken over from the lease of Oil Sands, Limited. This site is in the northern section of the bituminous sand area. The bituminous sands at this location contain a distinctly less viscous oil than those at the Abasand Oils, Limited plant near McMurray. Also, it is down the Athabaska River where large scale development must be, if and when it takes place. The experimental plant will make use of the practical experience of Oil Sands, Limited, and the research and experimental plant experience of the Research Council of Alberta."



Vermilion — filling oil truck from storage tank

Mr. Lilge in his presentation deals with the silica sands of this area, after separation from the bitumen, and with the question of their adaptability for glass manufacture, discussing economics, transportation of product and other matters which require consideration. The distribution of these three publications will give much interesting detail surrounding this great natural resource.

CANADA'S OIL PRODUCTION In 1944 and 1945

(Quantities in barrels)			
	1944	1945	CHANGES
Alberta -----	8,788,726	8,055,440	-- 733,286
Northwest Territories -----	1,223,675	351,000 (x)	-- 872,675 (x)
Ontario -----	125,067	114,000 (x)	-- 11,067 (x)
New Brunswick -----	23,296	31,000 (x)	+ 7,704 (x)
Saskatchewan -----	-----	16,507	+ 16,507
TOTALS -----	10,160,764	8,567,947 (x)	- 1,592,817 (x)

(x) Estimated.

It will be noticed by this table that the two big declines for Canada's oil production for 1945 come from the Northwest Territories and from Alberta. The decrease for the Territories, as explained in the Alberta half-yearly review, is due to the closing of the Whitehorse refinery in March of 1945, which was followed by the shutting down of the majority of the producing wells in the Fort Norman field. Only those required for production of aviation fuel and for use in the mining areas of the Northwest have since been producing. The decline from the Northwest Territories, plus that from Alberta, unfortunately gives the Dominion a total decrease (preliminary figure) of 1,592,817 barrels.

The Province of Saskatchewan appears in 1945 for the first time amongst the Canadian oil producing provinces. It is gratifying that this should be so, and the hope is expressed that the oil production of that province will grow. The total shown in the above table represents recoveries from the Lloydminster field on the Saskatchewan side.

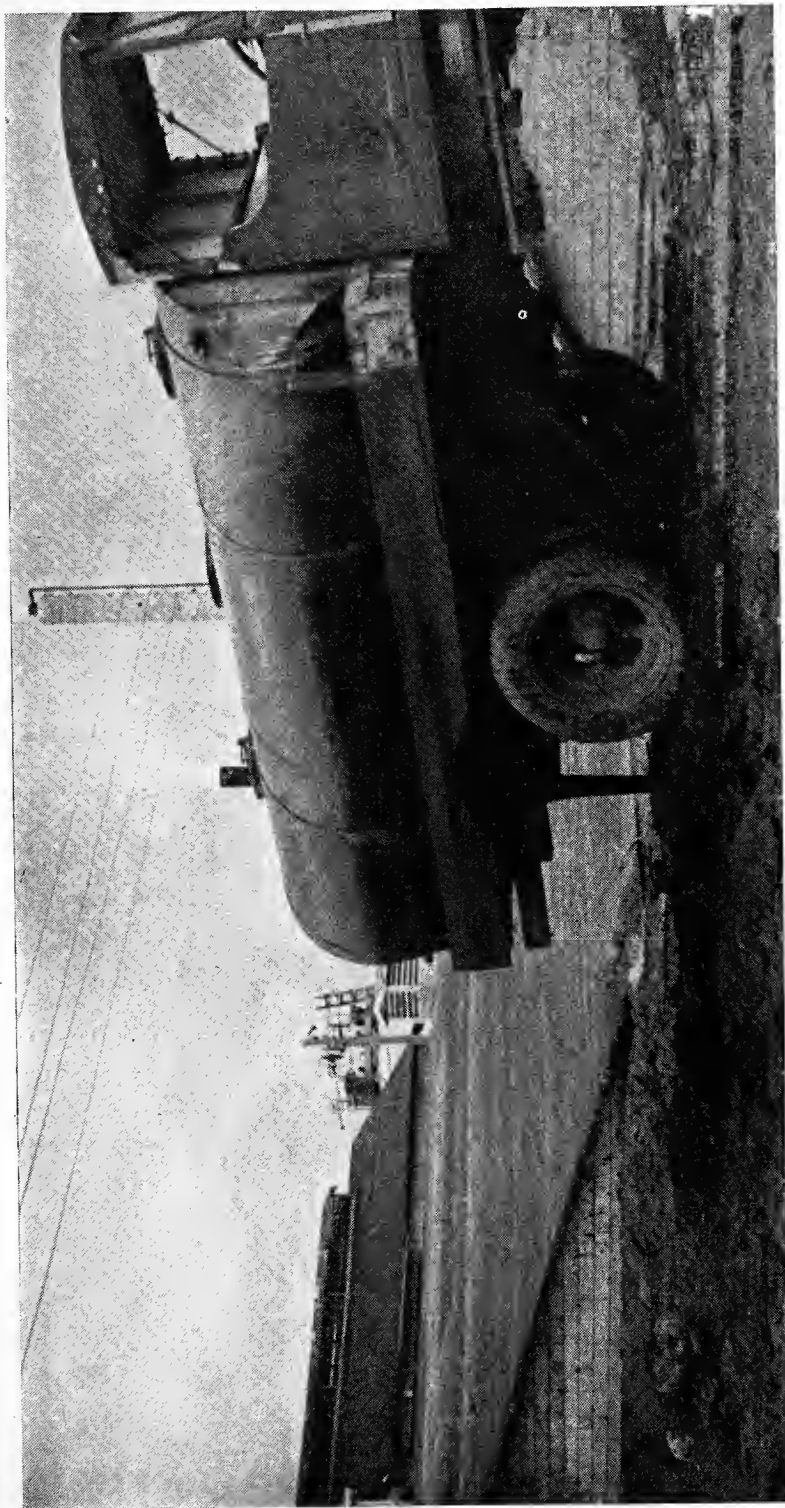
BRITISH EMPIRE PRODUCTION

With the post-war period started, it is possible once again to include all the oil producing countries within the British Empire in the following statement. The figures given are preliminary, those opposite enemy controlled countries being somewhat general. For the first time, however, since 1941 they are all there, and to them it is now possible to add the oil production totals (preliminary figures) from England which are given for 1944 and 1945.

BRITISH EMPIRE OIL PRODUCTION

(Quantities in barrels)			
	1944	1945 (a)	CHANGES (a)
Trinidad -----	22,000,000	21,500,000	-- 500,000
Canada -----	10,099,404	8,567,947	-- 1,531,457
Bahrein Island -----	6,800,000	7,304,000	504,000
Burma -----	750,000	750,000	-----
India -----	3,000,000	3,000,000	-----
Brunei -----	11,000,000	8,000,000	-- 3,000,000
Sarawak -----	4,000,000	4,000,000	-----
England -----	670,000	500,000	-- 170,000
TOTALS, BRITISH EMPIRE -----	58,319,404	53,621,947	-- 4,697,457

(a) Preliminary figures.



Vermilion — crude oil being dumped into the sump at cleaning plant

WORLD OIL PRODUCTION

Oil production for the world in 1945 reached still another record with a total of 2,493,680,000 barrels. The figure is a preliminary one and is exclusive of Russia and some of the Axis controlled countries, the production from which in 1945 is not yet known. Russia, in previous years, produced in excess of ten per cent of the annual world totals, and no doubt did so again, or even better, last year. This percentage, added to that of the Axis controlled countries not heard from, would bring the world total for 1945, to around 2,700,000,000 barrels, an outstanding annual record in the world's oil industry.

The principal areas responsible for this huge production total were the United States with 1,754,190,000 barrels, Venezuela with 295,550,000, the Near and Middle East with 184,690,000 and Mexico with 42,340,000. Each total is an increase from last year and is a record for the area named. Like the world total, the figures given are all preliminary.

CONCLUSION

The two outstanding features of Alberta's oil industry in 1945 were the increased production of fields outside of Turner Valley, and the determined exploratory work through the province which was carried out and is continuing to be. The extension of the Viking-Kinsella natural gas reserve towards the close of the year was also a gratifying feature. Amongst other things it no doubt helped to make Alberta more conscious of the wealth of her gas reserves and to take stock of the many provincial gas fields—their sizes, records and potentialities. Canada consumed 50,794,000 mcf. of natural gas (preliminary figure) last year, of which 43,746,338 mcf. (final figure), or 86.12 per cent, was produced in Alberta.

In spite of a heavy oil production decline in 1945, Alberta produced, nevertheless, 94.01 per cent of Canada's total, whilst Turner Valley, principal cause for the decline, presented Alberta with 92.13 per cent of the province's total.

If oil is to continue in this scientific age as a source of energy, and if, in the not too distant future, natural petroleum should become increasingly difficult to procure, the question of synthetic recoveries of same may possibly receive serious consideration.

If this should happen, it is well to remember that Alberta has three most powerful aids waiting to be introduced into the oil industry, namely, the processing of natural gas, bituminous sands and coal. Alberta's reserves, containing these three, are amongst the richest and most extensive in the world.

The separation processes of natural gas are now being carried out at a plant in Louisiana. The results of such processing will be the production of gasoline, diesel fuel, alcohol and other by-products. With the knowledge that such method of operation has been proved



PHOTO BY DON COLTMAN

Samples of structure taken from wells every ten feet

to be an economic success, it will then be interesting to speculate on the possibilities of Alberta's industrial future in this respect, due to her possession of one of the largest natural gas reserves on the continent. Possessing also one of the largest and richest accumulations of bituminous sands in the world, with an oil content officially estimated to reach astronomical figures, petroleum recoveries from this source, when their separation from the sands are pronounced to be economically possible, will represent another intensely important aid to the oil industry.

Alberta contains the bulk of Canada's coal reserves. Classifications of Alberta coal come under the headings of semi-bituminous, bituminous, sub-bituminous and lignite or domestic. Bituminous coal contains 126 by-products, of which oil is amongst the most important. Fifty-nine per cent of Alberta's coal is bituminous in classification.

In the January 5th issue of the Petroleum Times of London, England, the question of oil recovery from coal is discussed, and Professor H. W. Melville of the University of Aberdeen is quoted on the subject. Adverse economics apparently still represent an obstacle to be overcome in such processing. The professor concluded his remarks on this subject by saying: "It is evident that unless natural petroleum becomes much more difficult to obtain, there is not much hope of producing synthetic fuel at a cost comparable to the natural material. At the moment there is no obvious way in which liquid fuel can be made from coal at a cost comparable with that of natural petroleum."

This, no doubt, is applicable to Alberta as well. Germany, during the war, employed the process of coal hydrogenation in desperately trying to increase oil production, and, as a result, advanced it from a rate of about sixteen million barrels a year to a rate in the neighbourhood of fifty million, but at a prohibitive cost. Following this peak production, the synthetic plants were continually being smashed in bombing raids.

From an economic standpoint, the production of natural petroleum, at least for the time being, is most feasible. If, however, it becomes increasingly difficult to procure, the recovery of synthetic oil from natural gas, bituminous sands or coal, on a major basis, may materialize. Should this happen, it will be gratifying to realize that there is sufficient oil in Alberta's coal reserves alone to meet the world's requirements for a period of many centuries. With the advent of such changed conditions, the plants will presumably be established, and the products of their industry will become available to meet home requirements, and the requirements of lands beyond the borders of Canada.

In the meantime, the hunt for natural petroleum continues in Alberta. If a second Turner Valley should come into being, it will mean the erection of still another important milestone in the province's thirty-year oil history, during which time she has produced some eighty-three million barrels of oil, valued at one hundred and thirty-seven million dollars. With the establishment of one or more major oil fields, these totals will expand considerably to strengthen still further Alberta's economy, and that of the Dominion.

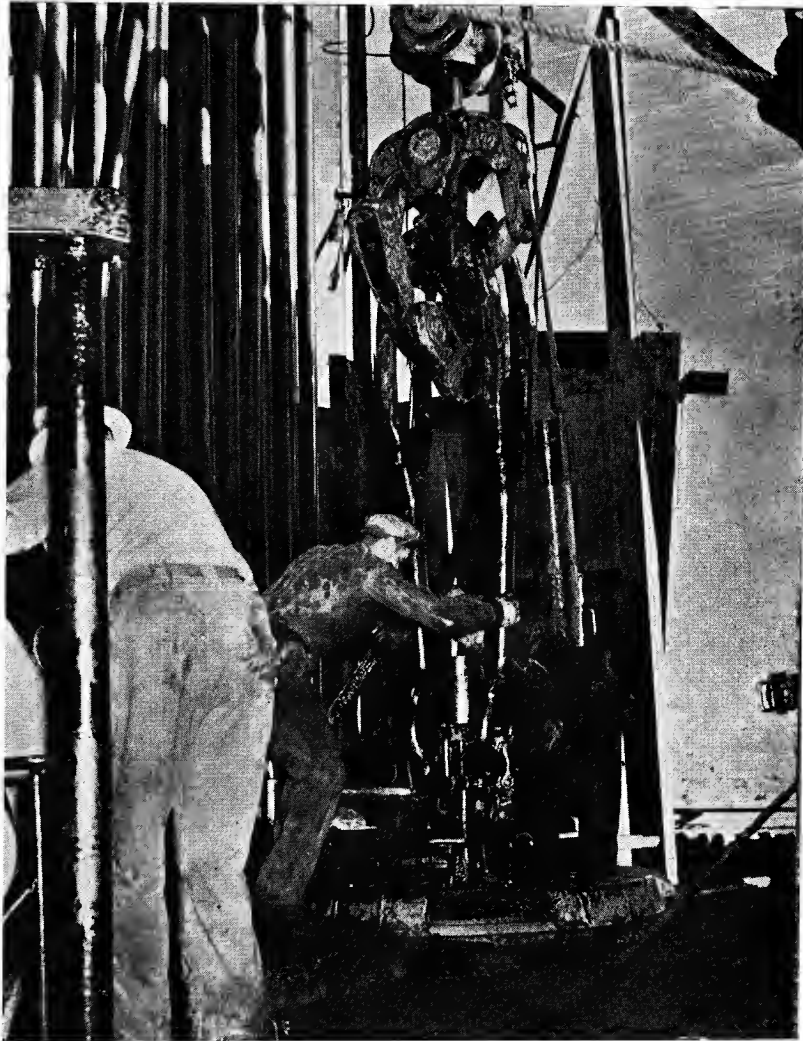


PHOTO BY DON COLTMAN

Running tools in rotary well

FOOTAGE OF WELLS DRILLED FOR OIL IN ALBERTA

YEAR	TURNER VALLEY	REST OF ALBERTA	TOTALS
Prior to 1927 -----	115,391	532,241	647,632
1927-----	53,340	31,626	84,966
1928-----	111,160	56,380	167,540
1929-----	240,020	130,577	370,597
1930-----	123,583	105,751	229,334
1931-----	61,939	54,613	116,552
1932-----	13,096	19,525	32,621
1933-----	51,806	20,043	71,849
1934-----	78,278	17,946	96,224
1935-----	27,462	33,011	60,473
1936-----	52,470	46,145	98,615
1937-----	245,531	46,423	291,954
1938-----	303,112	60,180	363,292
1939-----	281,274	93,013	374,287
1940-----	297,018	72,779	369,797
1941-----	377,860	113,410	491,270
1942-----	348,772	160,915	509,687
1943-----	244,535	243,399	487,934
1944-----	266,145	331,683	597,828
1945-----	159,049	384,388	543,437
TOTALS-----	<u>3,451,841</u>	<u>2,554,048</u>	<u>6,005,889</u>

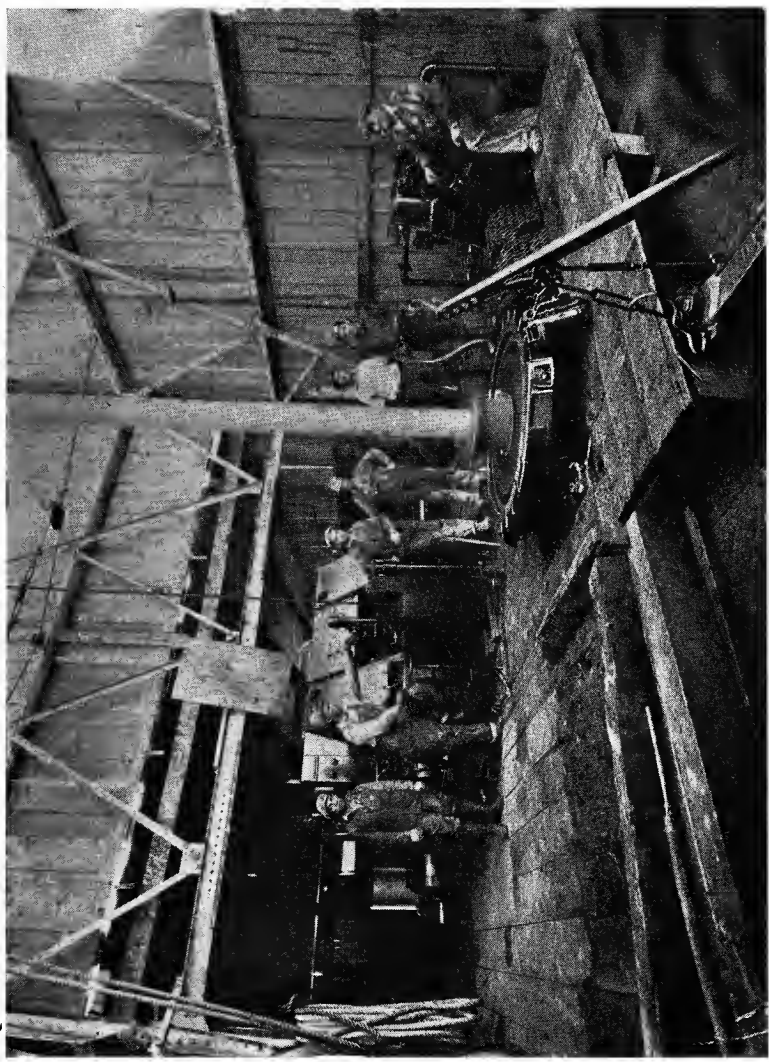


PHOTO BY LANE'S STUDIO, HIGH RIVER, ALTA.
Drilling in Turner Valley. Derrick floor with draw works controlling feed. Separate engine operates rotary table

ALBERTA'S OIL-FIELDS

(As at December 31st, 1945)

FIELDS	PRODUC- ING WELLS	DAILY AVERAGE PRODUC- TION (Barrels)	WELLS DRILL- ING	PRODUCING DEPTHS (Feet)	GRAVITY A.P.I.	BASE	OUTLET	AGE OF FIELD
TURNER VALLEY: 40 miles south of Calgary:								
Limestone, crude	250	17,599	7	6,800-9,600	39°-48°	Intermediate	Canadian Prairies	9½ years
Limestone, distillate	22	76	Nil	3,700-6,800	55°-73°	"	"	21 "
Limestone, natural gasoline .....	.....	1,259	Nil	3,700-6,800	73°	"	"	21 "
Shallow crude	2	8	Nil	3,200-3,700	49°-50°	"	"	31 "
FIELDS OUTSIDE TURNER VALLEY:								
Del Bonita, Montana border	2	5	Nil	5,200	35°-37°	"	"	6 "
Taber, S.E. Alberta	11	321	Nil	3,200	18°-24°	"	"	7 "
Princess, S.E. Alberta	8	207	Nil	2,500-3,900	27°-34°	"	"	5 "
Conrad, S.E. Alberta	17	517	Nil	3,100	25°	"	"	18 months
Wainwright, 150 miles east of Edmonton	7	50	Nil	2,200	18°	Hybrid	Local	20 years
Vermilion, 150 miles east of Edmonton	47	569	Nil	1,800	14°	Naphthenic	C.N.R., Mtn. Div.	6 "
Lloydminster, east of Edmonton, (Saskatchewan border)	9	115	Nil	1,900	14°	"	"	6 "
MISCELLANEOUS: (Intermittent production only)								
Tilley, S.E. Alberta .....	.....	.....	.....	3,200	18°	Intermediate	Canadian Prairies	4 "
Jumping Pound	1	.....	1	10,000	47°	"	"	1 "

ALBERTA CUMULATIVE OIL PRODUCTION TABLE BY CALENDAR YEARS
(Quantities in Barrels of 35 Imperial Gallons)

CALEN- DAR YEARS	TURNER VALLEY			FIELDS OUTSIDE TURNER VALLEY			
	CRUDE OIL PRODUCTION		NATURAL GASOLINE RECOVERED	TURNER VALLEY TOTALS	VERMILION HEAVY CRUDE	CONRAD HEAVY CRUDE	TABER HEAVY CRUDE
	SHALLOW ZONE	LIMESTONE ZONE					
1914-21	56,599		76	(a) 56,675			
1922	6,559		9,237	15,796			
1923	1,943		8,060	10,003			
1924	2,932		13,128	17,749			
1925	2,926	1,689	8,951	180,885			
1926	2,609	169,008	374,422	281,108			
1927	38,808	203,725	7,283	213,617			
1928	70,910	284,595	5,854	329,257			
1929	73,181	410,448		481,358			
1930	50,897	908,411		981,592			
1931	26,936	1,316,102		1,366,999			
1932	21,757	1,345,310		1,372,246			
1933	23,915	854,517		876,274			
1934	22,307	766,755		976,451			
1935	18,903	796,140	185,781	1,232,771			
1936	13,011	711,451	414,324	1,227,035			
1937	10,589	671,948	496,681	1,287,319			
1938	9,192	2,098,970	657,169	2,766,728			600
1939	8,431	16,689,581	531,434	6,691,138			15,098
1940	7,309	23,940,644	296,787	7,556,281	202		19,418
1941	6,014	32,113,660	274,172	8,454,497	10,817		19,418
1942	5,806	41,644,867	293,122	9,830,343	22,051		25,018
1943	4,865	51,340,786	302,216	10,003,935	56,819		54,837
1944	3,209	60,327,443	461,169	9,452,697	89,889		143,572
1945	3,932	68,202,362	448,186	8,326,314	183,147	24,733	292,210
		75,207,951	5,428,530	81,130,021	238,358	143,696	427,210
				7,422,061	656,108	168,429	

[illegible]

CUMULATIVE PRODUCTION TABLE—(Continued)

CALEN- DER YEARS	FIELDS OUTSIDE TURNER VALLEY										ALBERTA TOTALS	(b) VALUATIONS	
	DINA HEAVY CRUDE	SKIFF LIGHT CRUDE	KEHO LIGHT CRUDE	ARMELGRA HEAVY CRUDE	RED COULEE LIGHT CRUDE	TOTALS OF FIELDS OUTSIDE TURNER VALLEY						\$	\$
1914-21											56,675	218,200	218,200
1922											72,471	64,047	282,247
1923											10,003	41,333	323,580
1924											17,749	88,095	411,675
1925											180,885	717,271	1,128,946
1926											219,598	914,707	2,043,653
1927		529								5,981	332,312	1,529,477	3,573,130
1928		222								8,174	489,532	1,727,824	5,300,954
1929	2,839	1,432								999,523	2,322,550	3,424,021	8,724,975
1930	4,712	3,731								104,401	3,322,073	4,557,473	13,282,448
1931	10,362									1,436,259	3,758,332	5,977,788	17,260,236
1932	15,074									1,454,816	5,213,148	7,177,788	23,862,448
1933	15,074									918,154	6,131,302	2,606,907	31,367,658
1934	15,074									1,012,784	7,144,086	2,694,310	44,921,106
1935	15,074									1,266,049	8,410,135	3,031,446	64,713,935
1936	15,074									1,263,968	9,674,103	2,856,029	78,523,643
1937	15,074									1,320,428	10,994,531	2,918,730	94,040,909
1938	16,716									2,796,874	13,791,405	4,913,960	109,765,427
1939	6,383									6,743,101	20,534,506	8,639,488	124,233,488
1940	3,633									7,593,492	28,127,998	9,289,580	137,340,416
1941	4,746									8,495,207	36,623,205	10,503,249	157,187,947
1942	2,894									9,908,643	46,531,848	13,809,708	191,529,455
1943	34,372									(c) 10,136,296	56,668,144	15,517,266	212,576,827
1944	37,152									9,674,548	66,342,692	15,724,518	238,645,953
1945	200									8,788,726	75,131,418	14,468,061	267,892,147
	37,352									8,055,440	83,186,858	13,106,928	295,145,133
	37,352									633,379	2,056,837		

NOTE:—The cumulative Alberta Oil production tables appearing on the previous three pages, contain revisions based for the most part on additional data received. The most noticeable change is created by Royalite 4.

Figures in light faced type represent annual totals, and in black faced type the cumulative totals up to the end of the calendar year shown in the column in which they appear.

With the diminishing monthly totals of oil recovered from limestone gas wells, which by the close of 1944 were becoming more and more inconsequential in comparison with oil recovered from limestone oil wells, the Petroleum and Natural Gas Conservation Board decided, starting with January, 1945, to show future Turner Valley oil production records in three groups, classified as oil from shallow zone, oil from limestone zone and natural gasoline recovered. Should further detail under these three headings be required for the years dating back from 1944, such information is given in the cumulative oil production statements which are contained in the 1944 Alberta Oil Review, published by the Department of Trade and Industry, and in the Annual Reports of the Department of Lands and Mines for the fiscal years 1942-43 and 1943-44, which may be secured on application.

From 1921 to 1927, natural gasoline was derived from horizons above the limestone; from 1933 onward, from the limestone.

(a) Estimated. Production from 1914 to 1921 cannot be substantiated in detail, and is probably a minimum figure. Southern Alberta 1, later completed as Dalhousie 1, was the largest producer.

(b) Value of sales by primary producers have been revised after receiving considerable additional information on the years dating from 1923 to 1930. They must still, however, be considered as only rough estimates for that period, although they no doubt represent the probable value of oil produced at that time. During later years, actual sales of oil by primary producers are shown.

(c) Net production total, after deducting storage loss of 6,974 barrels.

PETROLEUM PRODUCTION IN THE BRITISH EMPIRE, 1932 TO 1945, INCLUSIVE

COUNTRY	1932		1933		1934		1935		1936		1937		1938	
	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.
Trinidad	10,126,121	43.1	9,561,353	41.2	10,894,363	41.2	11,671,224	40.7	13,237,030	39.2	15,502,989	36.8	17,737,060	35.5
Canada	1,044,412	4.4	1,145,333	4.8	1,401,895	5.3	1,447,204	5.0	1,504,287	4.5	2,943,750	7.1	6,956,811	14.0
Bahrein Island	902	.....	31,377	0.1	185,072	1.1	1,264,807	4.4	4,644,735	13.7	7,762,264	18.4	8,298,000	16.7
Burma	7,073,437	30.1	7,114,311	30.0	7,278,859	27.5	7,181,113	25.1	7,587,718	22.5	7,847,553	18.5	7,499,500	15.0
Brunei	1,200,026	5.1	2,035,656	8.6	2,705,350	10.2	2,037,810	7.1	1,978,329	5.8	2,161,653	4.9	2,330,200	4.7
India	1,743,878	7.4	1,628,803	6.9	1,921,863	7.3	3,302,905	11.5	3,296,938	9.7	4,397,038	10.5	5,387,210	10.8
Sarawak	2,329,733	9.9	2,206,815	9.3	1,942,591	7.4	1,776,593	6.2	1,547,882	4.6	1,655,505	3.8	1,624,880	3.3
Total British Empire	23,518,509	100.0	23,723,648	100.0	26,429,993	100.0	28,681,656	100.0	33,796,819	100.0	42,270,812	100.0	49,833,661	100.0
World Total	1,306,714,101	.....	1,438,767,449	.....	1,517,121,671	.....	1,651,993,118	.....	1,797,993,578	.....	2,046,650,389	.....	1,979,268,510	.....
Per cent. British Empire of World .....	.....	1.80	.....	1.65	.....	1.74	.....	1.74	.....	1.88	.....	2.06	.....	2.51

PETROLEUM PRODUCTION IN THE BRITISH EMPIRE—(Continued)

COUNTRY	1939		1940		1941		1942		1943		1944		1945	
	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.	BARRELS	PER CENT.
Trinidad	19,270,000	37.7	20,300,000	38.2	21,150,000	38.5	21,500,000	48.8	25,000,000	55.4	22,000,000	37.7	21,500,000	40.1
Canada	7,843,780	15.2	8,723,982	16.5	10,123,904	18.4	10,384,019	23.6	10,123,205	22.5	10,099,404	17.3	8,567,947	16.0
Bahrein Island	7,588,560	14.8	7,200,000	13.5	7,070,000	12.9	7,250,000	16.4	6,570,000	14.5	6,800,000	11.6	7,304,000	13.6
Burma	7,396,000	14.4	7,750,000	14.6	7,900,000	14.3	2,500,000	5.6	913,000	2.0	750,000	1.3	750,000	1.4
Brunei	2,164,000	4.2	5,742,000	10.7	5,245,000	9.6	.....	.....	.....	.....	11,000,000	18.8	8,000,000	14.9
India	5,755,000	11.1	2,150,000	4.1	2,245,000	4.0	2,500,000	5.6	2,555,000	5.6	3,000,000	5.2	3,000,000	5.6
Sarawak	1,327,000	2.6	1,321,000	2.4	1,275,000	2.3	.....	.....	.....	.....	4,000,000	6.9	4,000,000	7.5
England .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670,000	1.2	500,000	.9
Total British Empire..	51,344,340	100.0	53,186,982	100.0	55,008,904	100.0	44,134,019	100.0	45,161,205	100.0	58,319,404	10.00	53,621,947	100.0
World Total	2,068,667,520	.....	2,158,123,000	.....	2,227,125,000	.....	2,050,951,000	.....	2,311,741,000	.....	2,561,570,000	.....	2,493,680,000	.....
Per cent. British Empire of World....	.....	2.48	.....	2.46	.....	2.46	.....	2.15	.....	1.95	.....	2.27	.....	2.15

NOTE:—As previously stated, the estimated 1945 world oil total of 2,493,680,000 barrels, shown above, is exclusive of production from Russia and some of the Axis controlled countries, information concerning which is not at present available. Russia, in previous years, produced in excess of ten per cent of the annual world oil totals and, it is presumed, repeated or even improved on that performance for 1945, so that this percentage, plus that of a number of the Axis controlled countries, should present approximately an additional 250,000,000 barrels to the above figure. This would raise the estimate on total world oil production for 1945 to a figure in excess of 2,700,000,000 barrels—an outstanding record year in the history of petroleum development.

Regarding Canada's total of 8,567,947 barrels for 1945, 8,055,440 barrels, or 94.01 per cent, were produced in Alberta.

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OIL REVIEW --

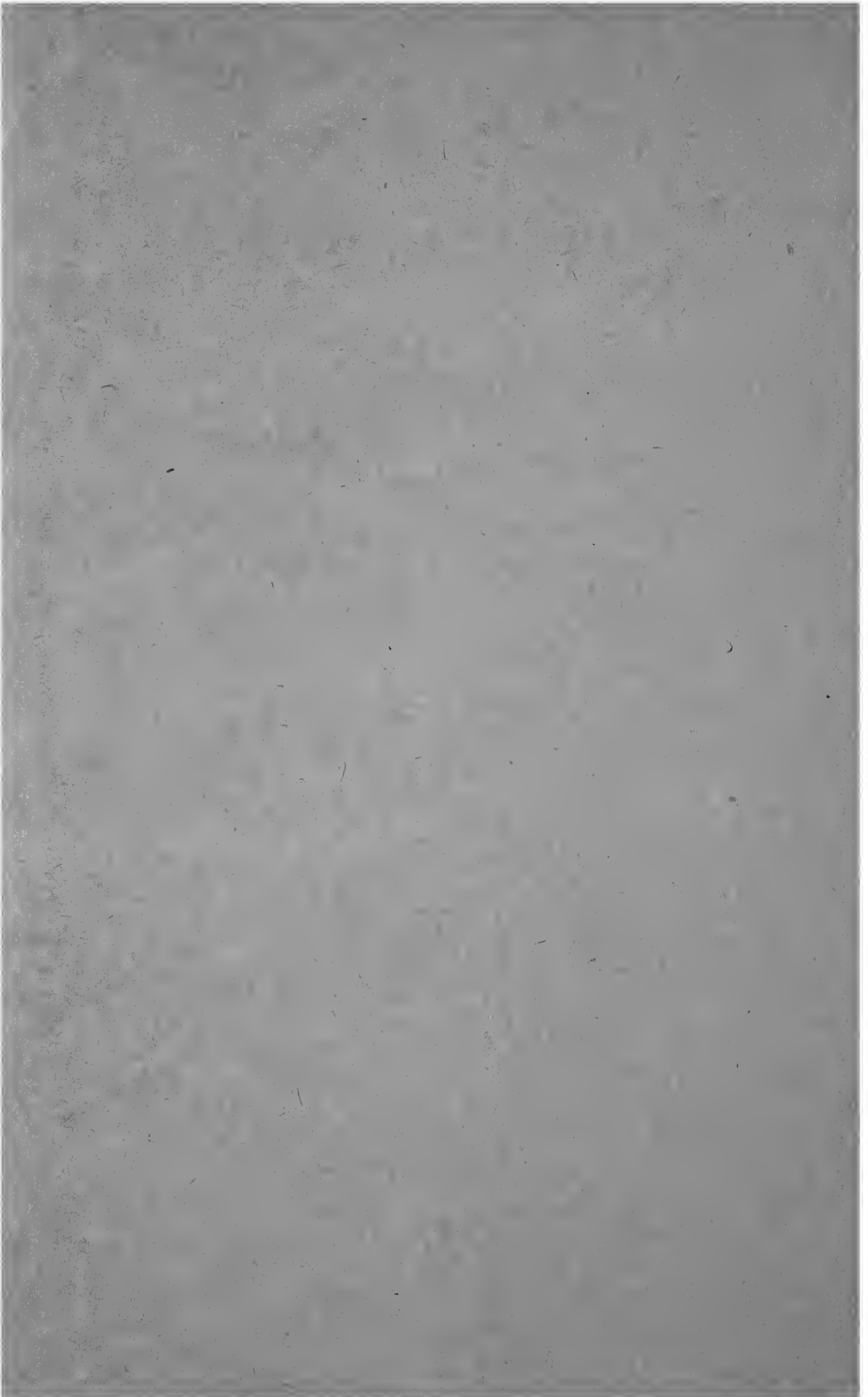
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